NJDEP Drought Warning Public Hearing

October 20, 2016

Water Supply Conditions Summary

New Jersey Department of Environmental Protection

Photo Credit: George M. Aronson

Drinking Water Supply Indicators

- Developed after 1999 drought
- Department wanted a better way to summarize regional hydrologic conditions as they relate to drinking water supply
- Need to concisely convey information to decision-makers and the public
- Designed to be updated quickly and periodically using real-time data
- Indicators to inform DEP decisions, not triggers
- Reports:
  - *Development of Streamflow and Groundwater Drought Indicators for New Jersey* online at: http://www.njgeology.org/pricelst/ofreport/ofr04-2.pdf
  - *Development of New Jersey Drought Regions* online at: http://www.njgeology.org/pricelst/tmemo/tm01-1.pdf

Drinking Water Supply Indicators con't.

- Apply to drinking water supply conditions
  - Do not apply to agricultural, ecologic or other types of drought
    - E.g., confusion between US Drought Monitor and DEP drought actions
  - DWSG regularly consults with other DEP program, agencies and departments
- Indicators include:
  - Precipitation
  - Reservoirs: NJ and DRBC (NY/PA); where applicable
  - Unconfined Groundwater levels
  - Stream flows
- Indicators are "weighted" based upon their relative significance as a drinking water source to the region
  - Local conditions within region may be different than regional ones

Overall Approach

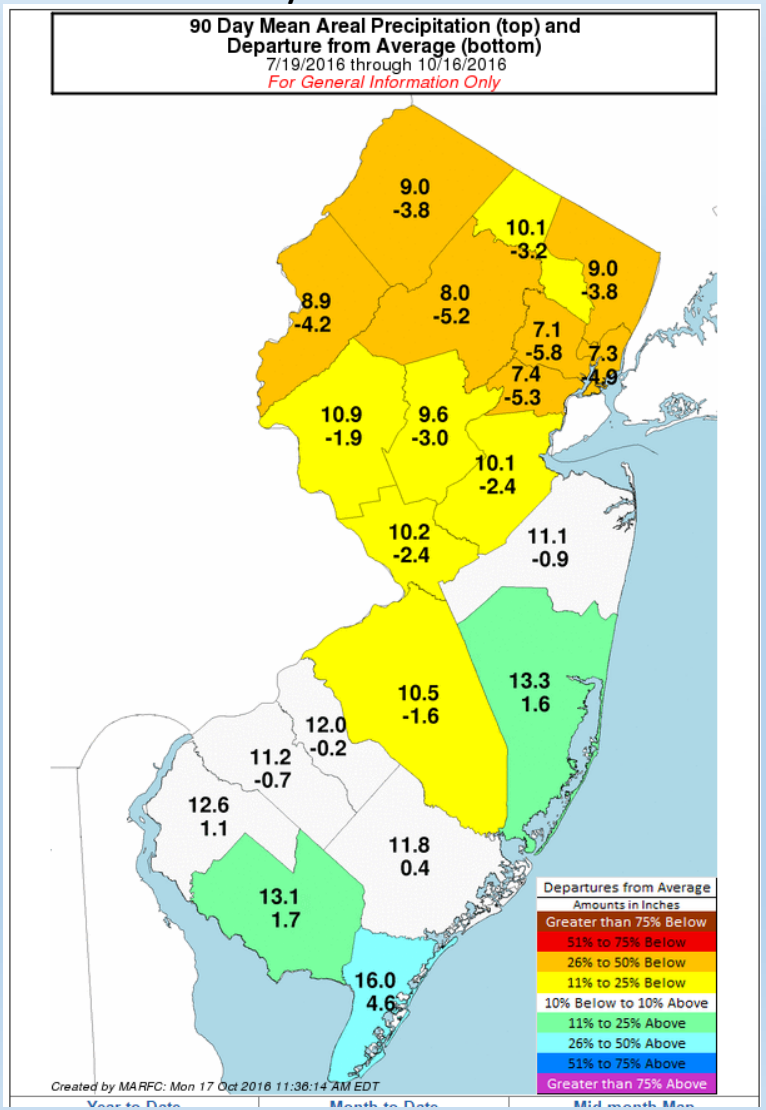
- Precipitation, streamflow and unconfined groundwater indicators
  - Analyses determined that the 90-day median, 30th percentile and 10th percentile cumulative departures from average were representative of different water supply conditions
    - In other words: a comparison of average vs observed
    - Subtract observed day from average for same day and add together the previous 90-days of differences
    - Larger deficits represent dry periods and smaller or negative deficits reflect wetter periods
    - As deficit gets larger, indicator conditions worsen
- Reservoirs
  - Compare to long-term averages and model simulations

Ranked as:

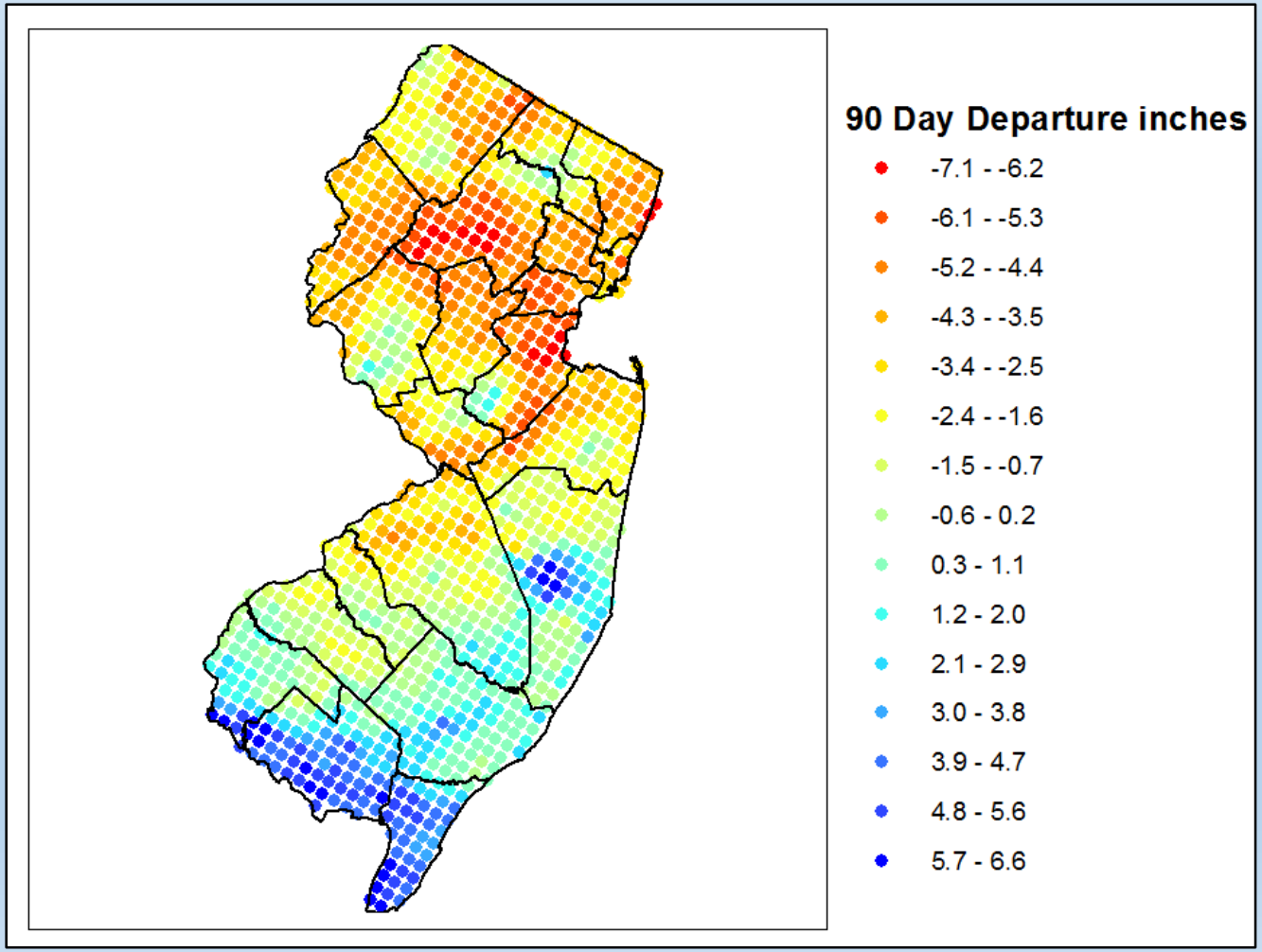
- Normal or above normal = Green
- Moderately dry = Yellow
- Severely dry = Orange
- Extremely dry = Red

Example Precipitation Indicator

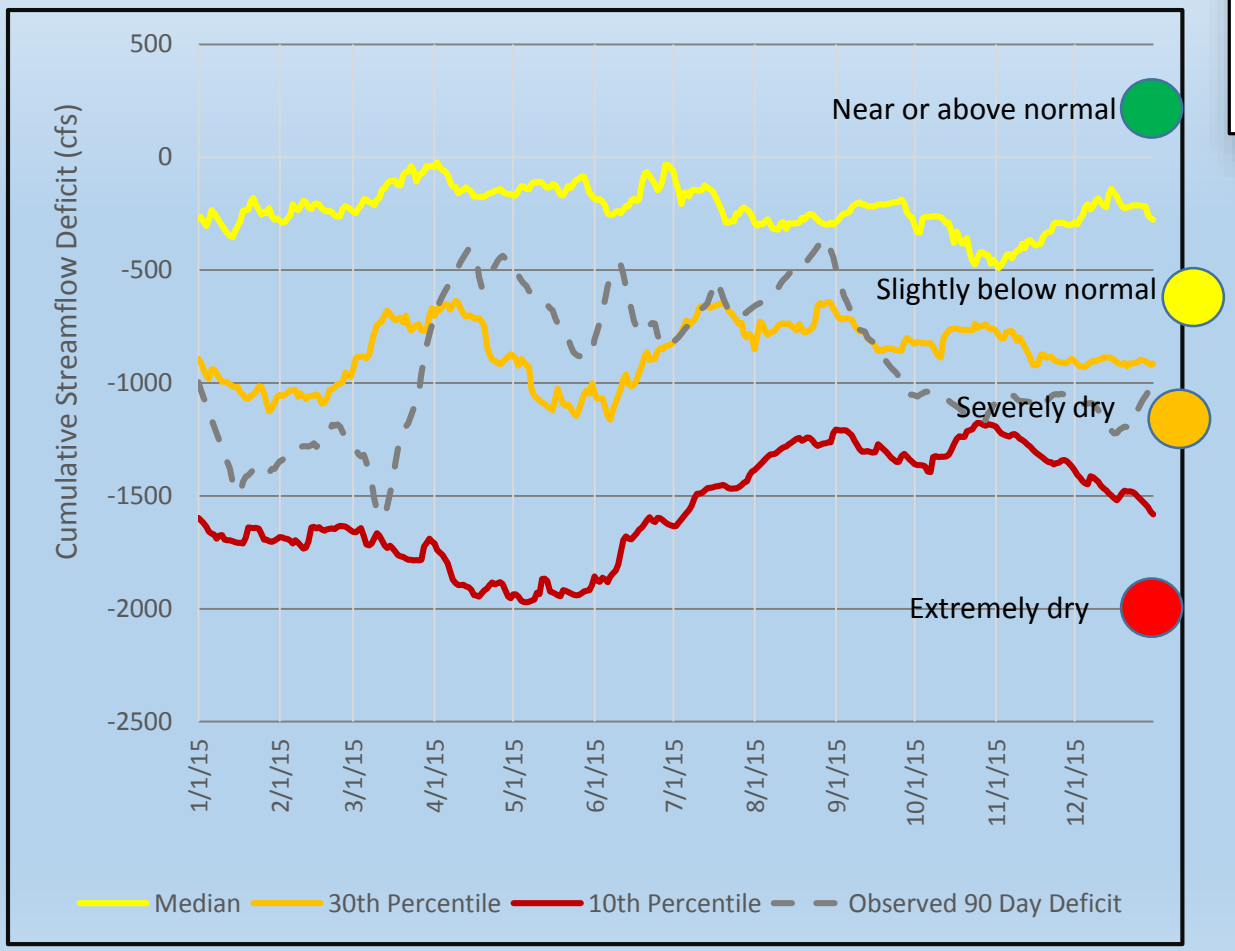
County-based NWS data

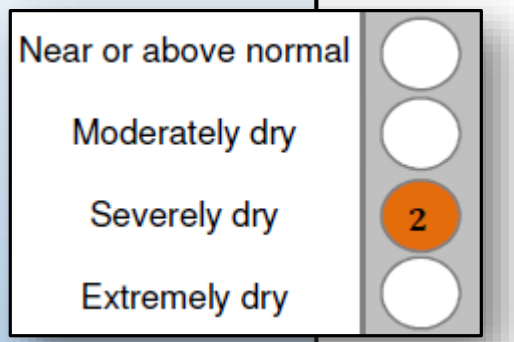


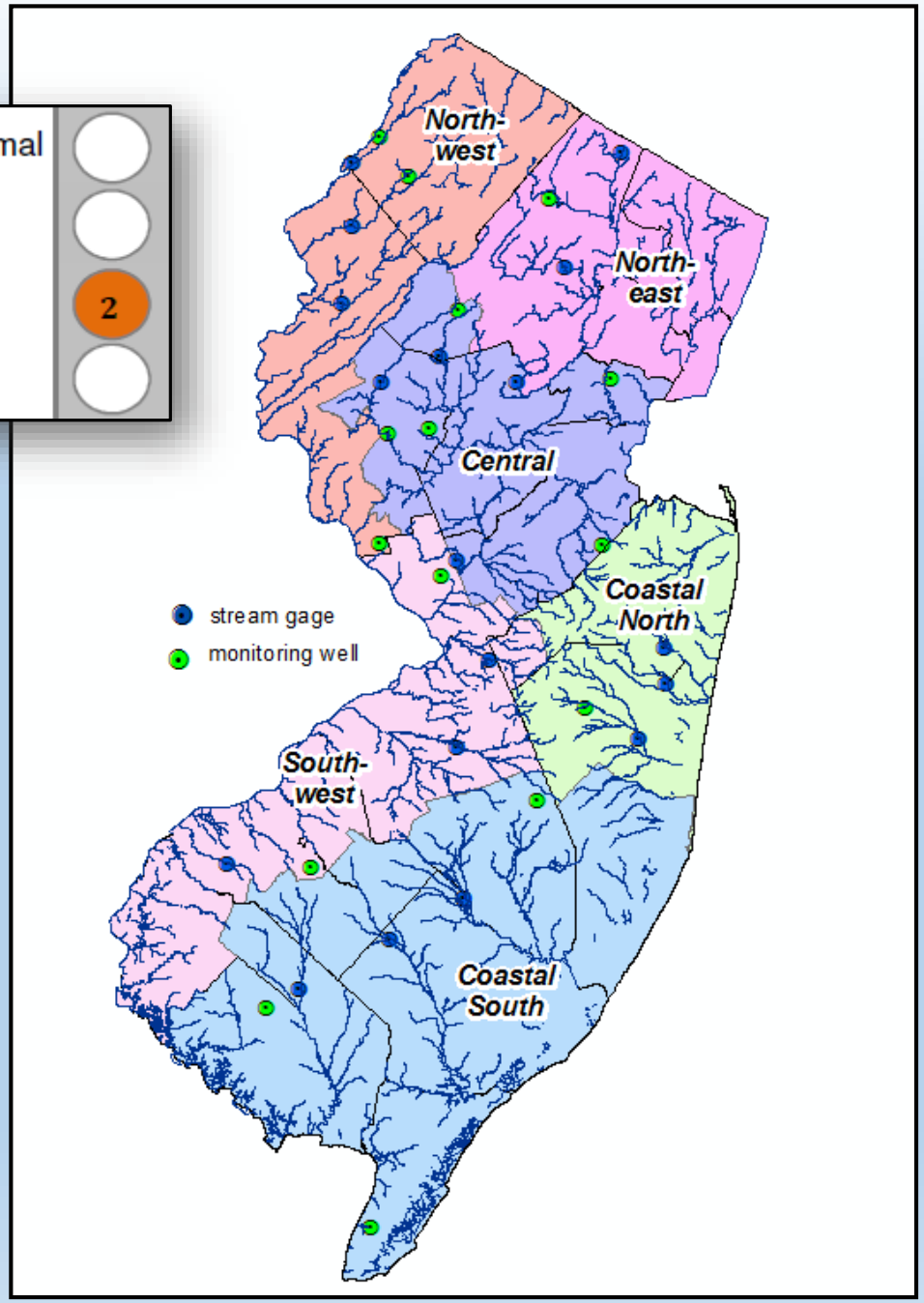
GIS-based NWS GIS



Example Streamflow Indicator

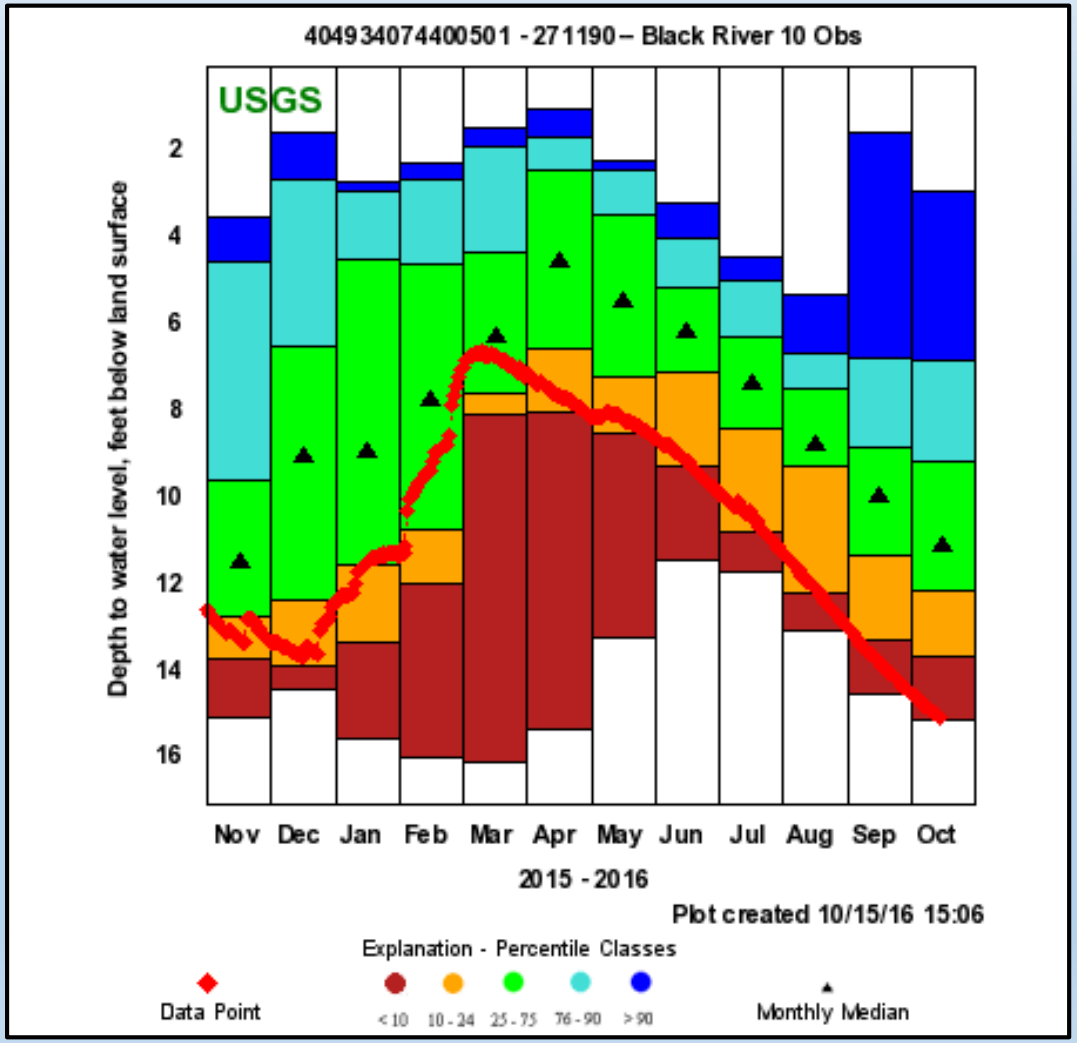




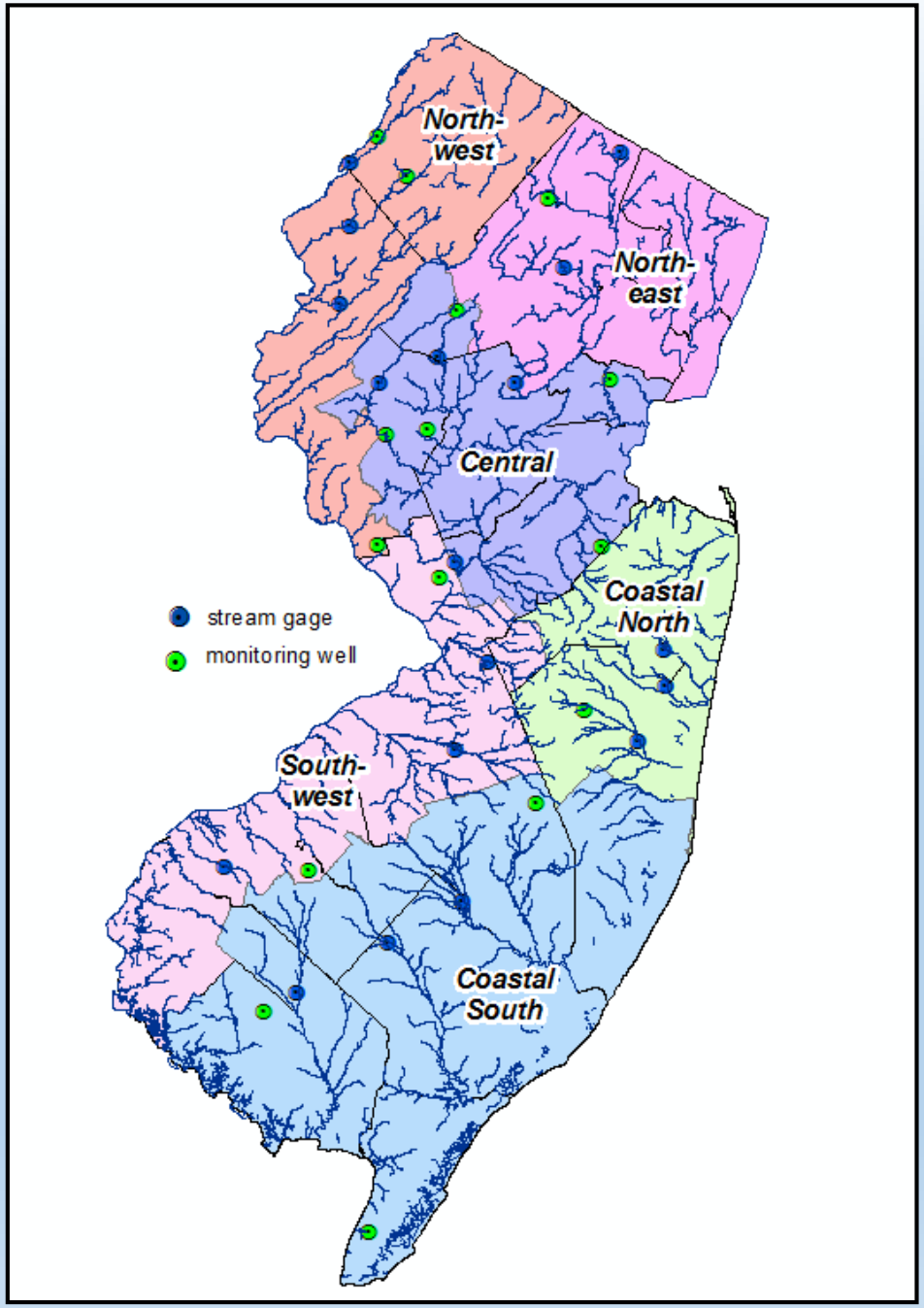


Use average of 3 stream gages per region to set indicator status

Example Groundwater Indicator

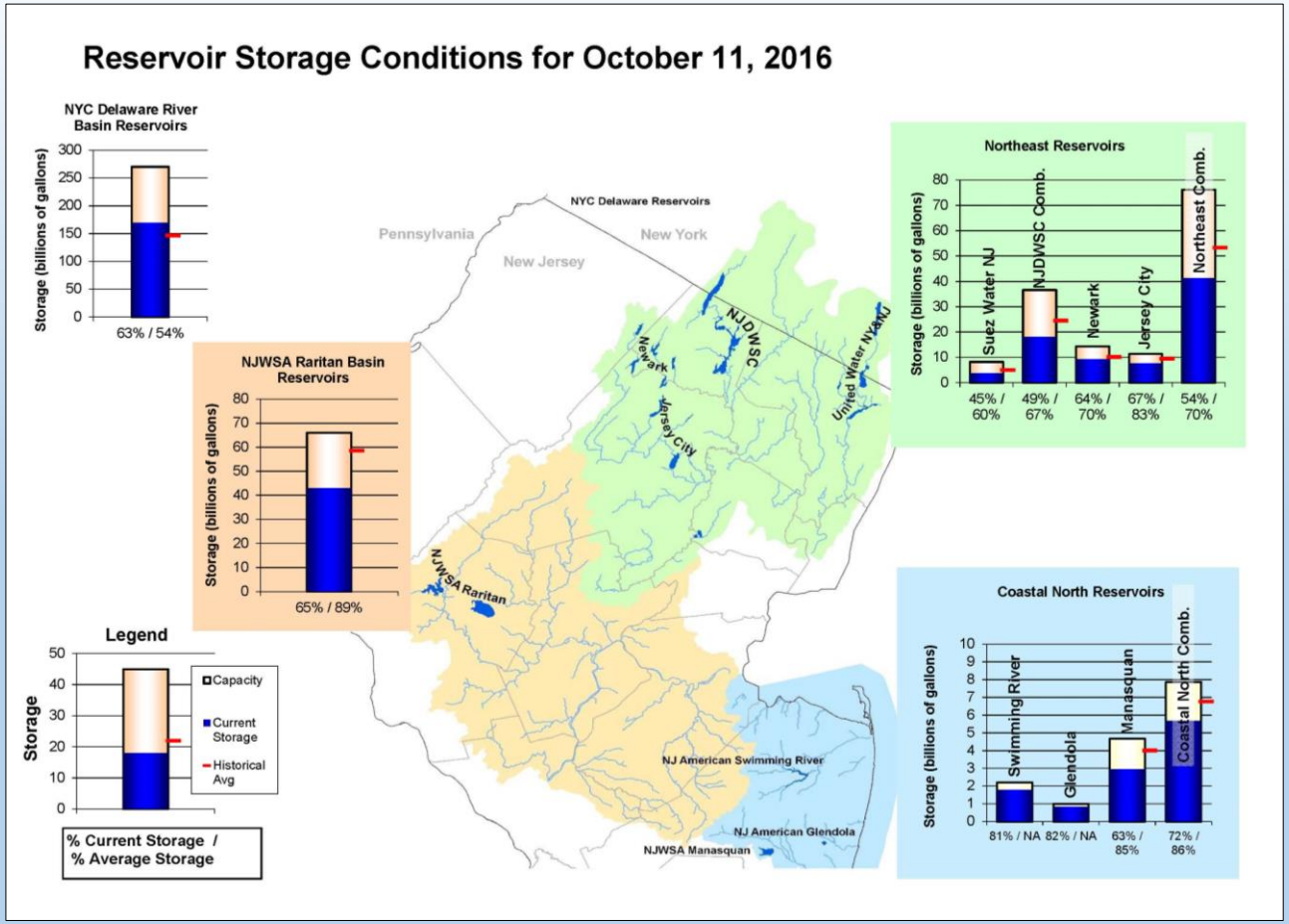


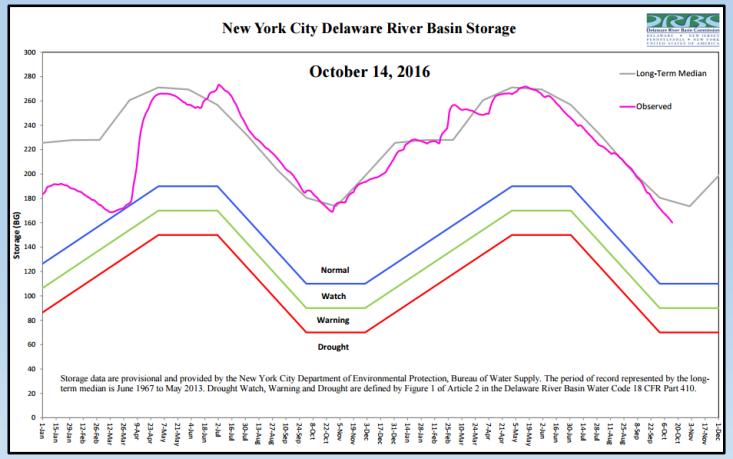
Use average of 3 unconfined aquifer wells per region to set indicator status



Reservoir Indicators

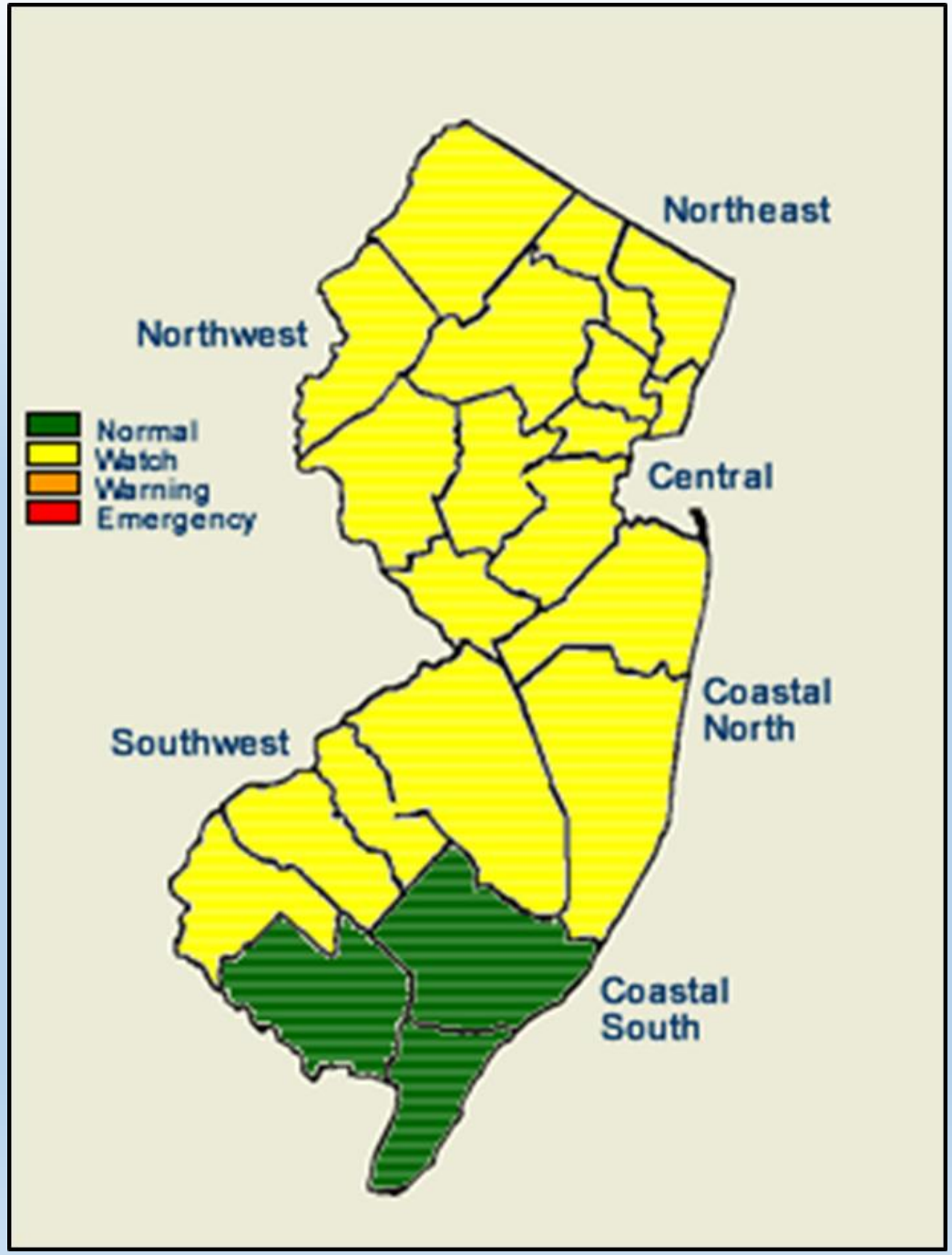
- Northeast: 6 major surface water purveyors, ~70 BG
- Central: 1 major surface water purveyor, ~66 BG
- Coastal North: 4 major surface water purveyors, ~8 BG
- Northwest & Southwest: PA & NYC DRBC reservoirs
- Several other “smaller” sources



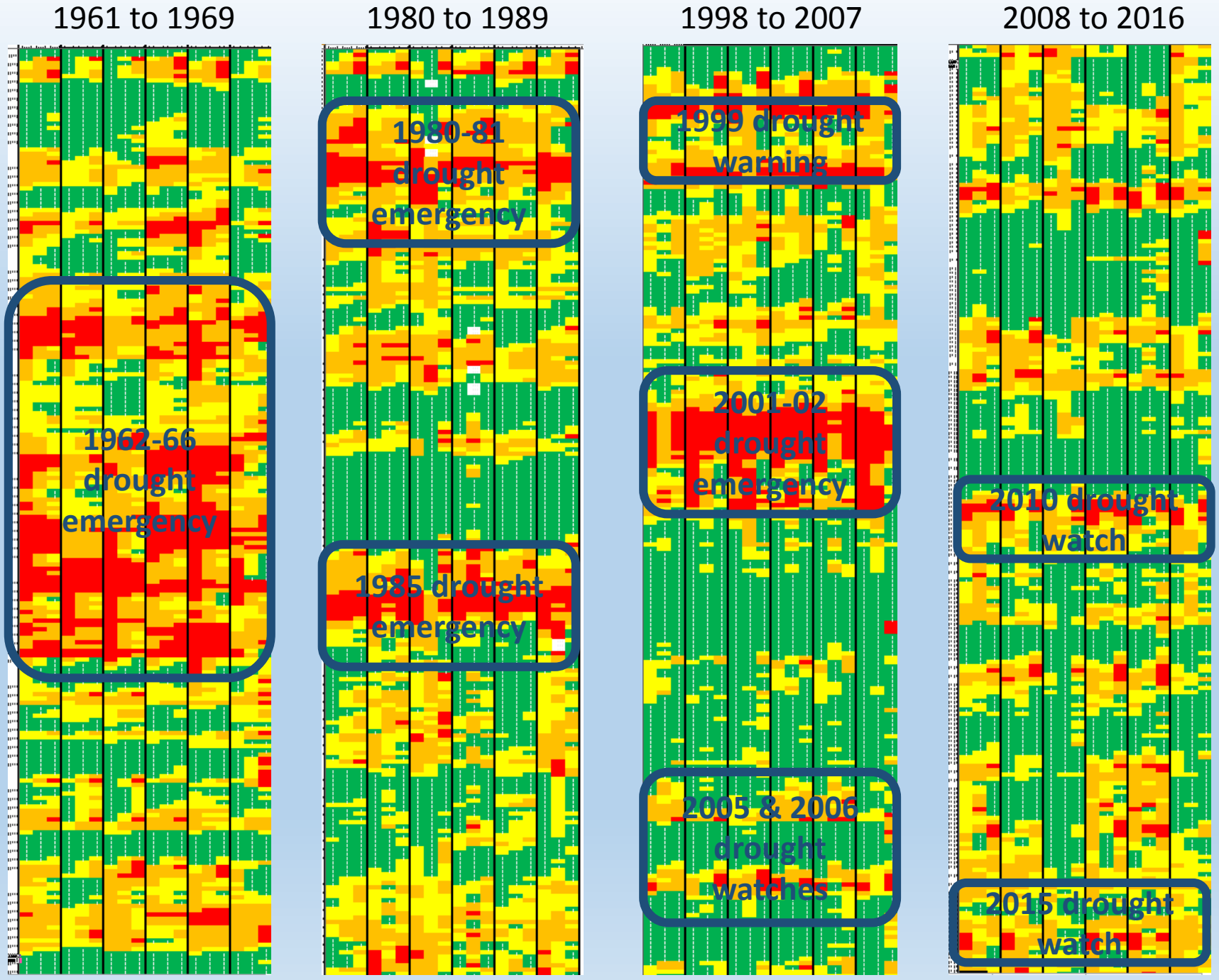


Declared Water Supply Status

- Determined using all available data
  - Status and Trend of indicators
  - Time of year
  - Precipitation/Temperature forecasts
  - Water demands
  - Water Supplier input
  - Other agencies, states
  - Best Professional Judgement

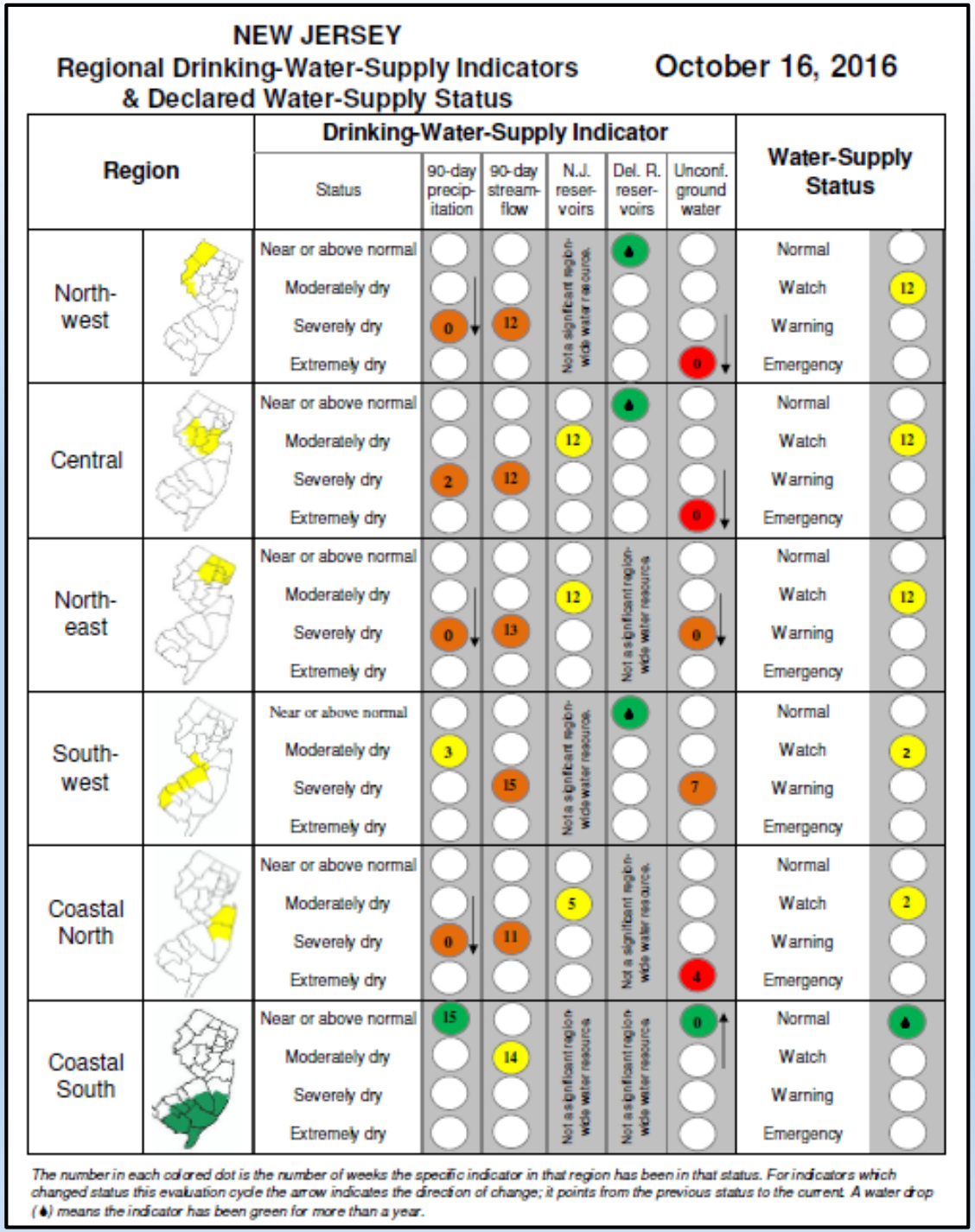


Simulated Historic Indicators vs. “Witnessed” Droughts



Note: The tables show the streamflow, groundwater and precip indicators for the Cen, CN, CS, NE, NW, SW regions, respectively.

October 16, 2016 Drinking Water Supply Indicators

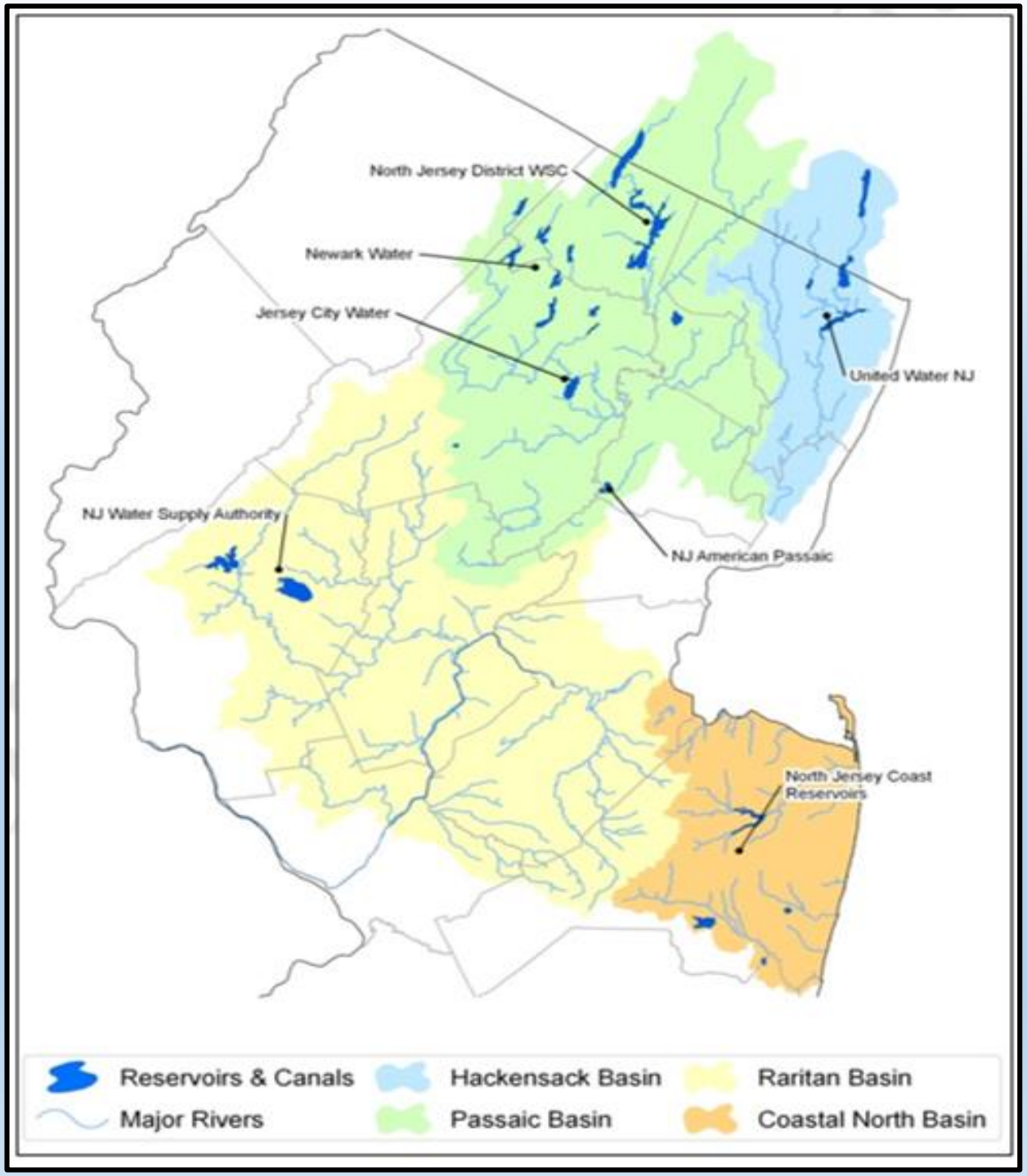


NEW JERSEY
Regional Drinking-Water-Supply Indicators & Declared Water-Supply Status — **October 16, 2016**

Region		Drinking-Water-Supply Indicator: Status	90-day precip-itation	90-day stream-flow	N.J. reser-voirs	Del. R. reser-voirs	Unconf. ground water	Water-Supply Status	
North-west		Near or above normal			Not a significant region-wide water resource.	💧		Normal	
		Moderately dry						Watch	12
		Severely dry	0	12				Warning	
		Extremely dry					0	Emergency	
Central		Near or above normal				💧		Normal	
		Moderately dry			12			Watch	12
		Severely dry	2	12				Warning	
		Extremely dry					0	Emergency	
North-east		Near or above normal				Not a significant region-wide water resource.		Normal	
		Moderately dry			12			Watch	12
		Severely dry	0	13			0	Warning	
		Extremely dry						Emergency	
South-west		Near or above normal			Not a significant region-wide water resource.	💧		Normal	
		Moderately dry	3					Watch	2
		Severely dry		15			7	Warning	
		Extremely dry						Emergency	
Coastal North		Near or above normal				Not a significant region-wide water resource.		Normal	
		Moderately dry			5			Watch	2
		Severely dry	0	11				Warning	
		Extremely dry					4	Emergency	
Coastal South		Near or above normal	15		Not a significant region-wide water resource.	Not a significant region-wide water resource.	0	Normal	💧
		Moderately dry		14				Watch	
		Severely dry						Warning	
		Extremely dry						Emergency	

The number in each colored dot is the number of weeks the specific indicator in that region has been in that status. For indicators which changed status this evaluation cycle the arrow indicates the direction of change; it points from the previous status to the current. A water drop (💧) means the indicator has been green for more than a year.

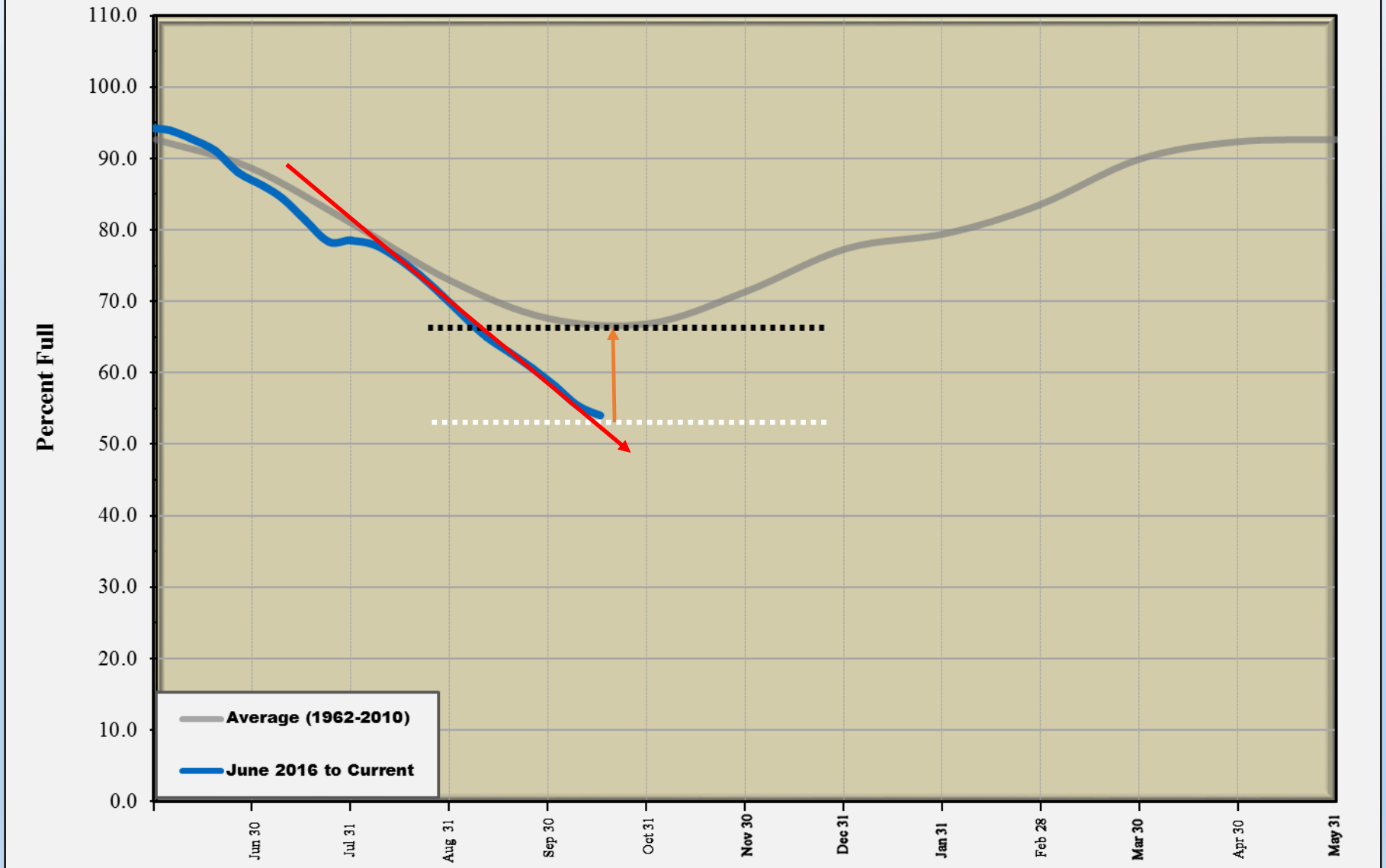
Reservoir Storage in the Regions



Map ID	Reservoir Name	Owner	Usable Storage (bg)	Water Source
Passaic Basin				
1	Greenwood Lake	NJDEP	6.86	Wanaque River
2	Monksville	NJDWSC	7.00	Wanaque River; pumping from Pompton River
3	Wanaque		29.6	
4	Canistear	City of Newark	2.41	Pacack Brook/Pequannock River
5	Clinton		3.5	Clinton Brook
6	Oak Ridge		3.91	Pequannock River
7	Charlottesburg		2.41	Pequannock River
8	Echo Lake		2.0	Macopin River
11	Split Rock	Jersey City	3.14	Beaver Creek
12	Boonton		8.16	Rockaway River
14	Canoe Brook #1 & 2 Cedar Ridge	New Jersey American (NJAW)	2.9	Canoe Brook/Passaic River
15	Point View	Passaic Valley Water Comm.	2.2	Pumping from Pompton River
Hackensack Basin				
16	Lake DeForest	United Water NY	5.7	Hackensack River
17	Lake Tappan	United Water New Jersey	2.0	Hackensack River
18	Woodcliff Lake		0.9	Pascack Brook
19	Oradell Reservoir		3.5	Hackensack River
Raritan Basin				
20	Spruce Run	NJ Water Supply Authority (NWSA)	11.0	Spruce Run
21	Round Valley		55.0	Pumping from Raritan, South Branch
Northeast Coastal Plain				
22	Swimming River	NJAW	1.8	Swimming River
23	Glendola		0.9	Shark River/Jumping Brook
24	Manasquan	NJWSA	4.7	Manasquan River/Timber Swamp Brook
25	Brick	Brick Twp. MUA	1.0	Metedeconk River
27	Delaware & Raritan Canal	NJWSA	n/a	Delaware River

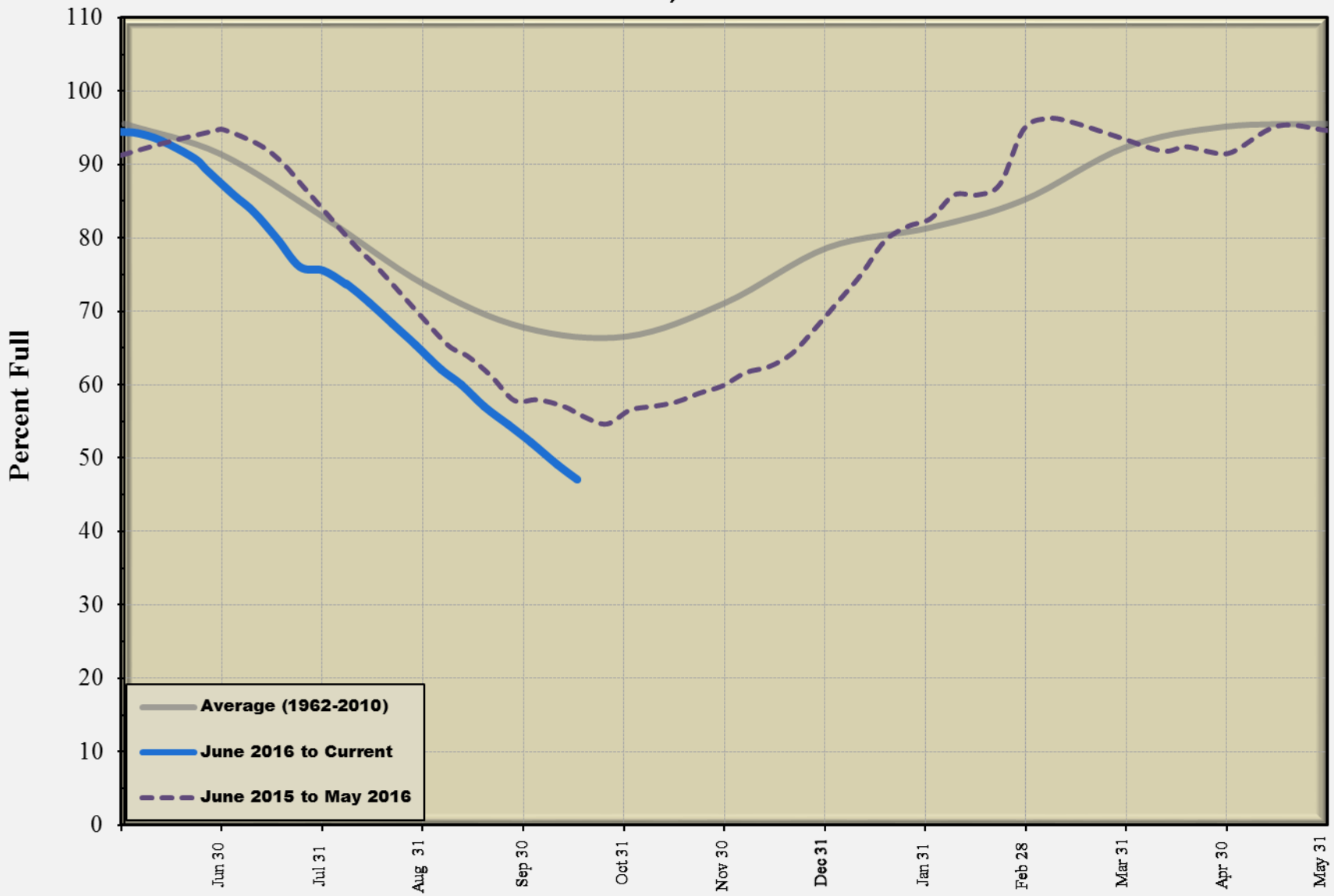
Combined Northeast Reservoir Storage

October 17, 2016



North Jersey District Reservoirs

October 17, 2016



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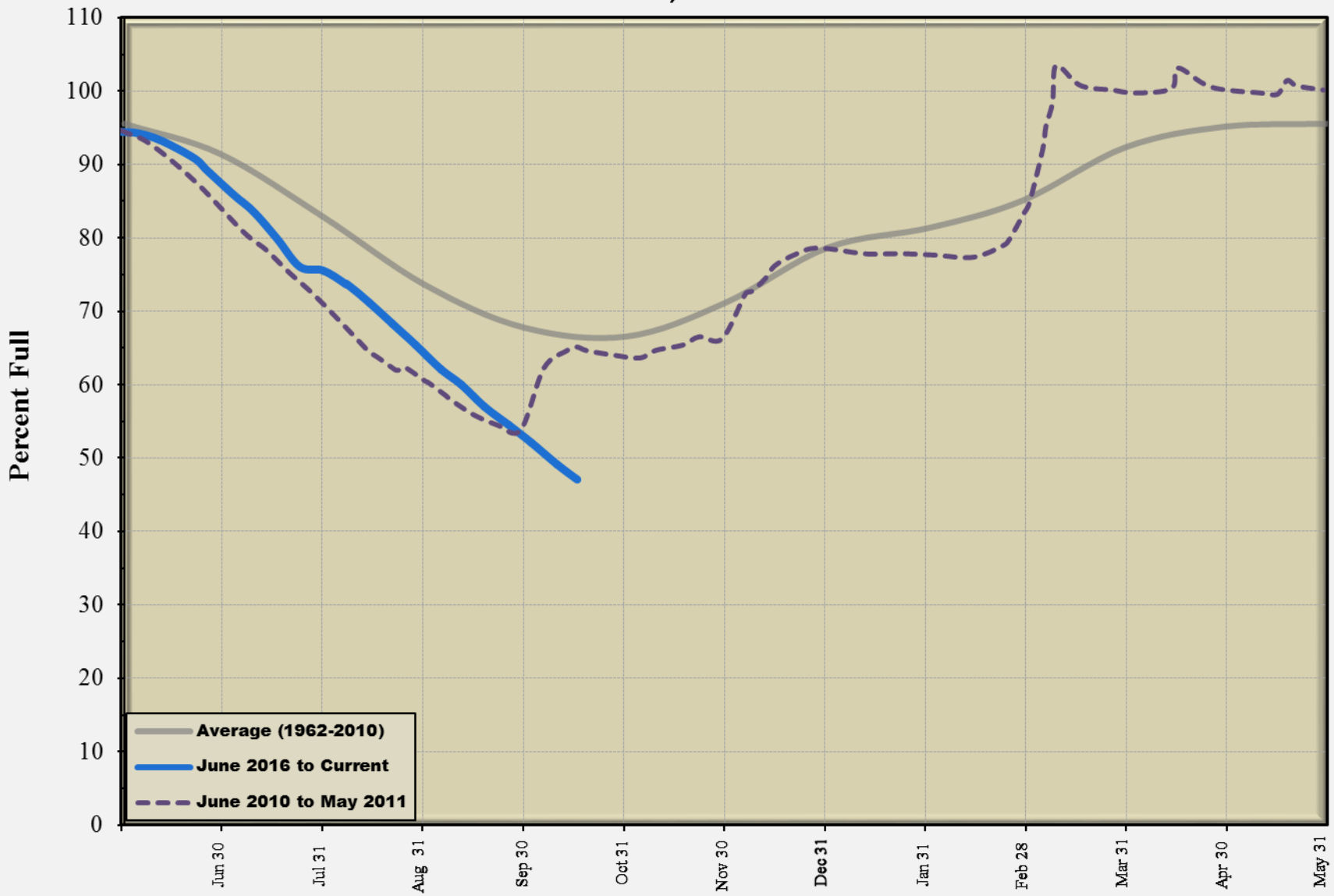

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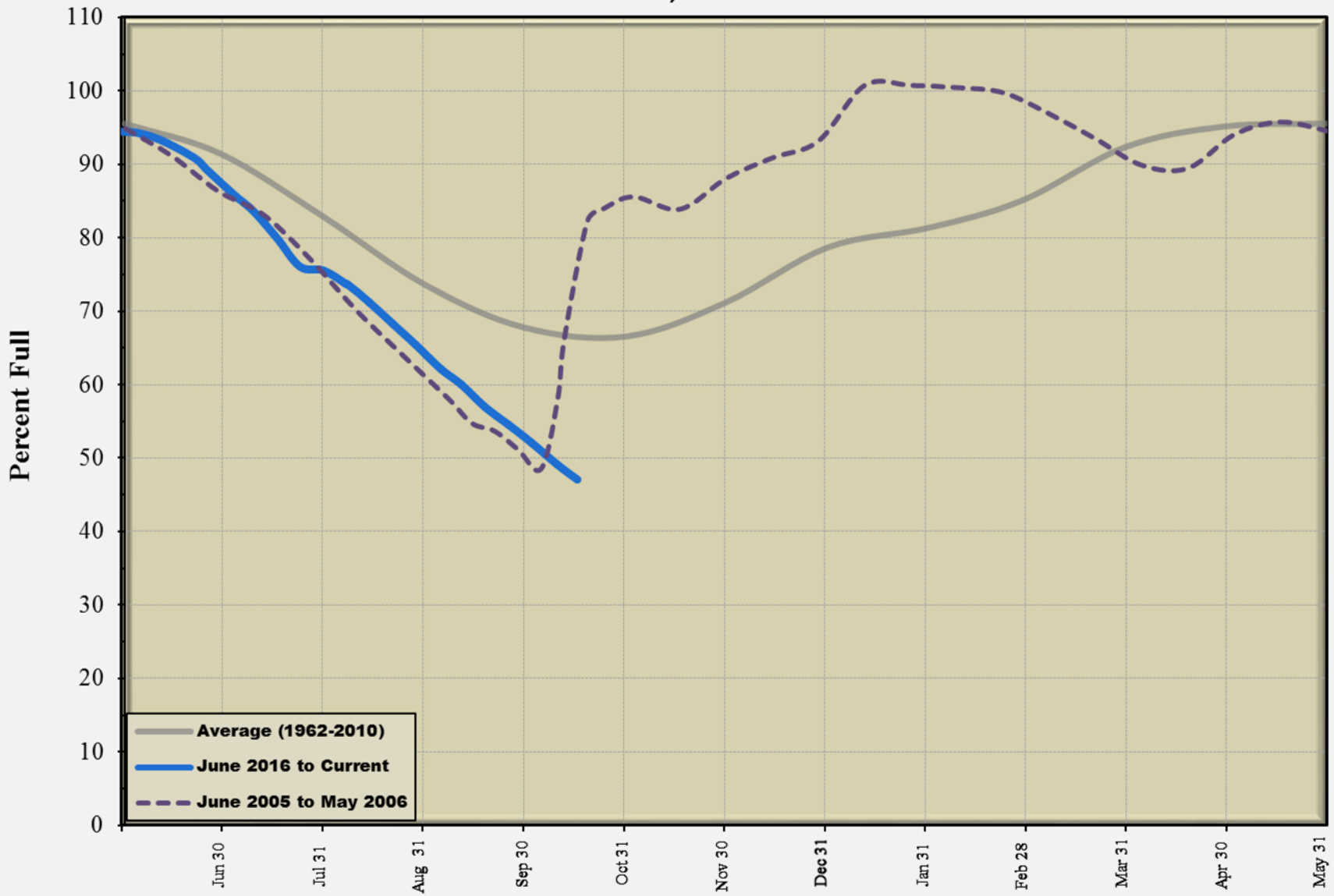
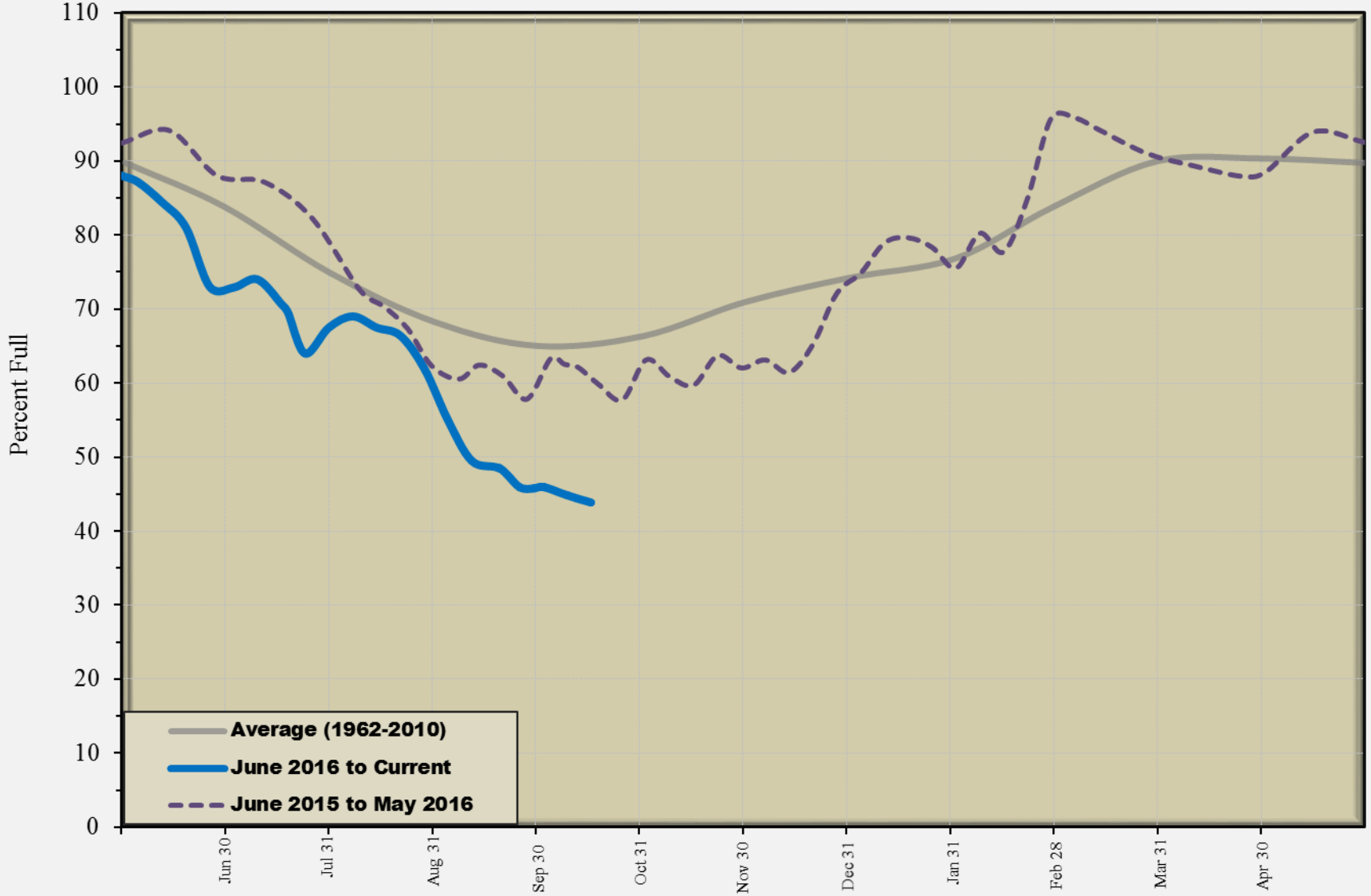


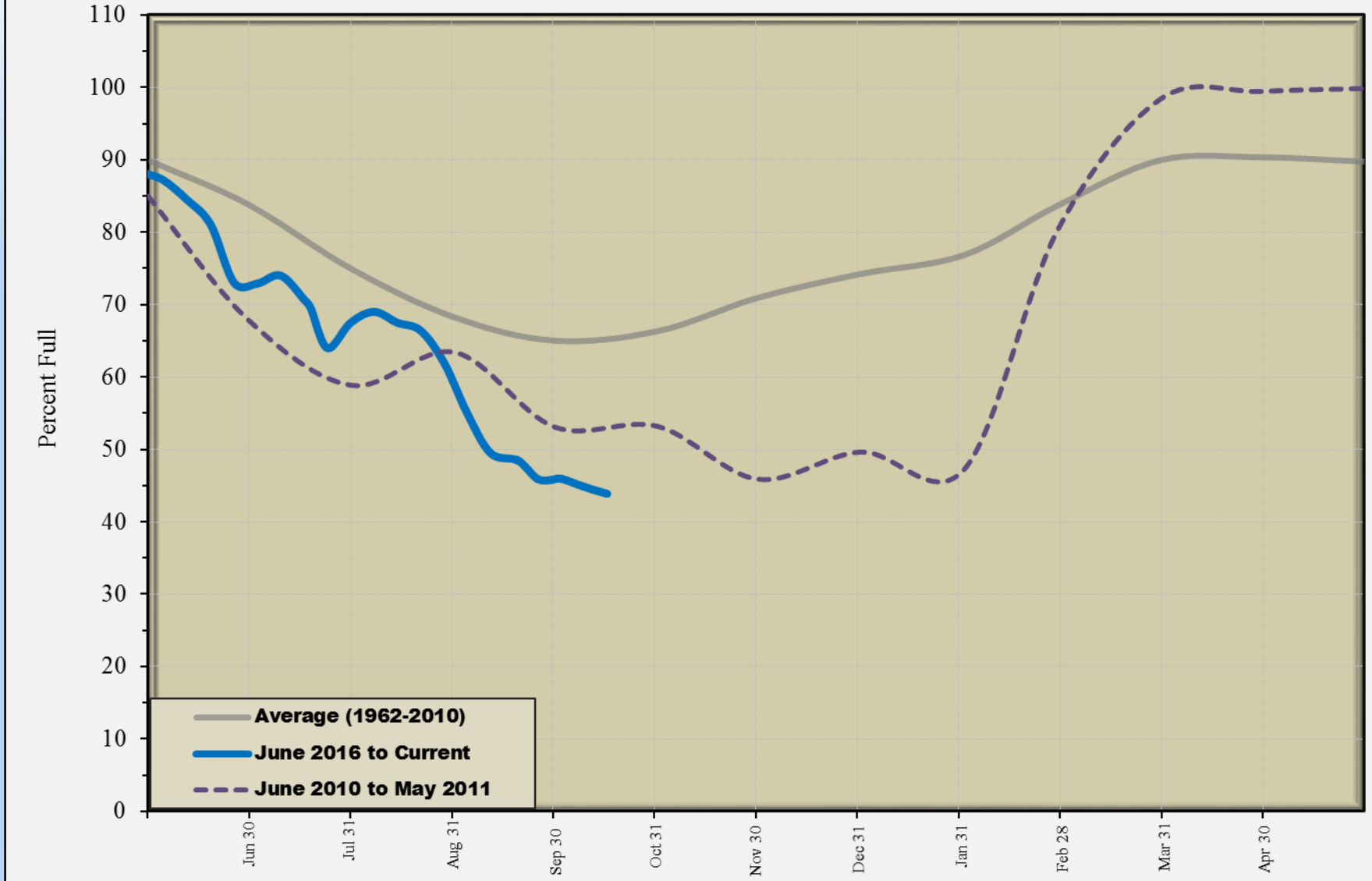
Suez-NJ Reservoir Storage

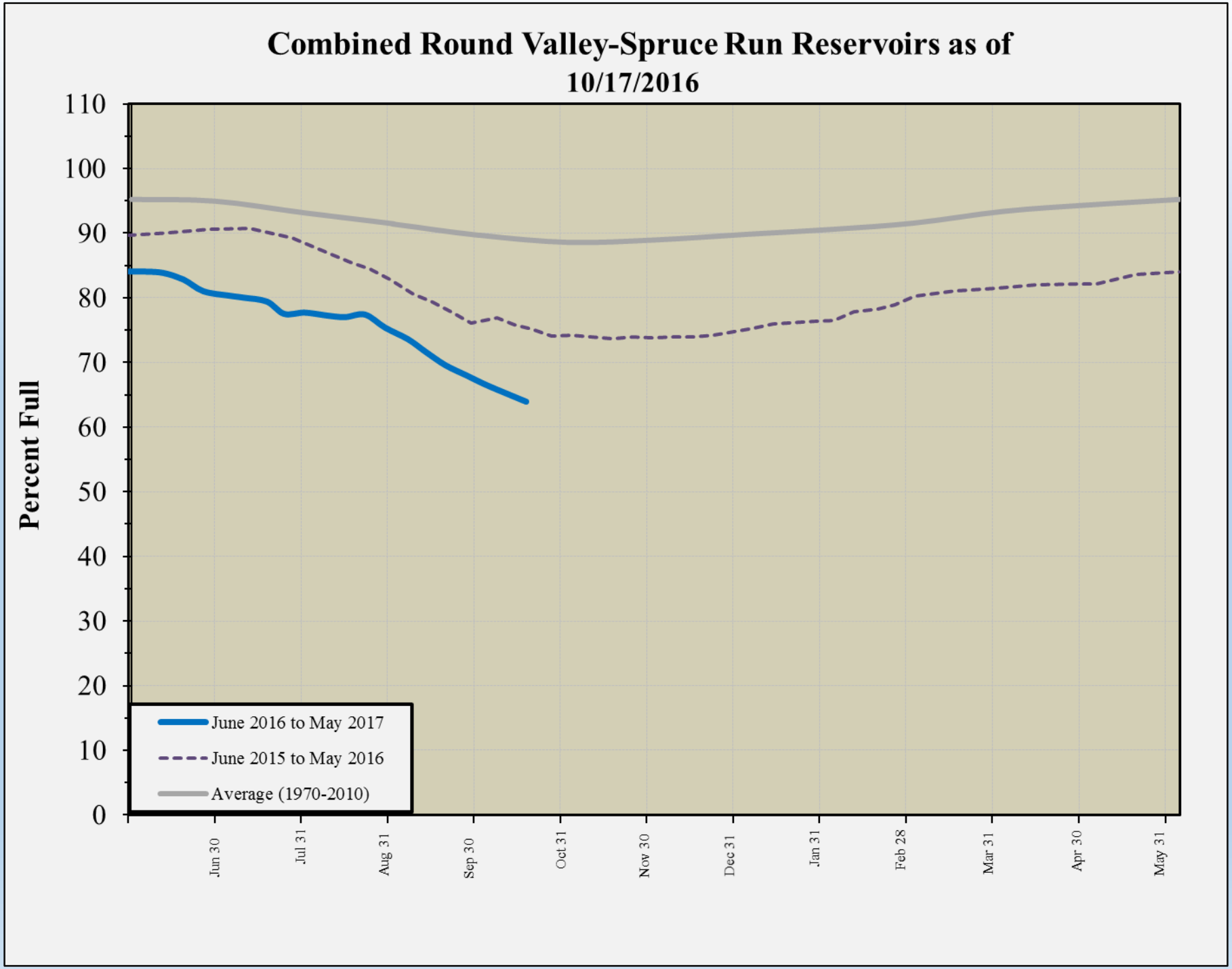
October 17, 2016



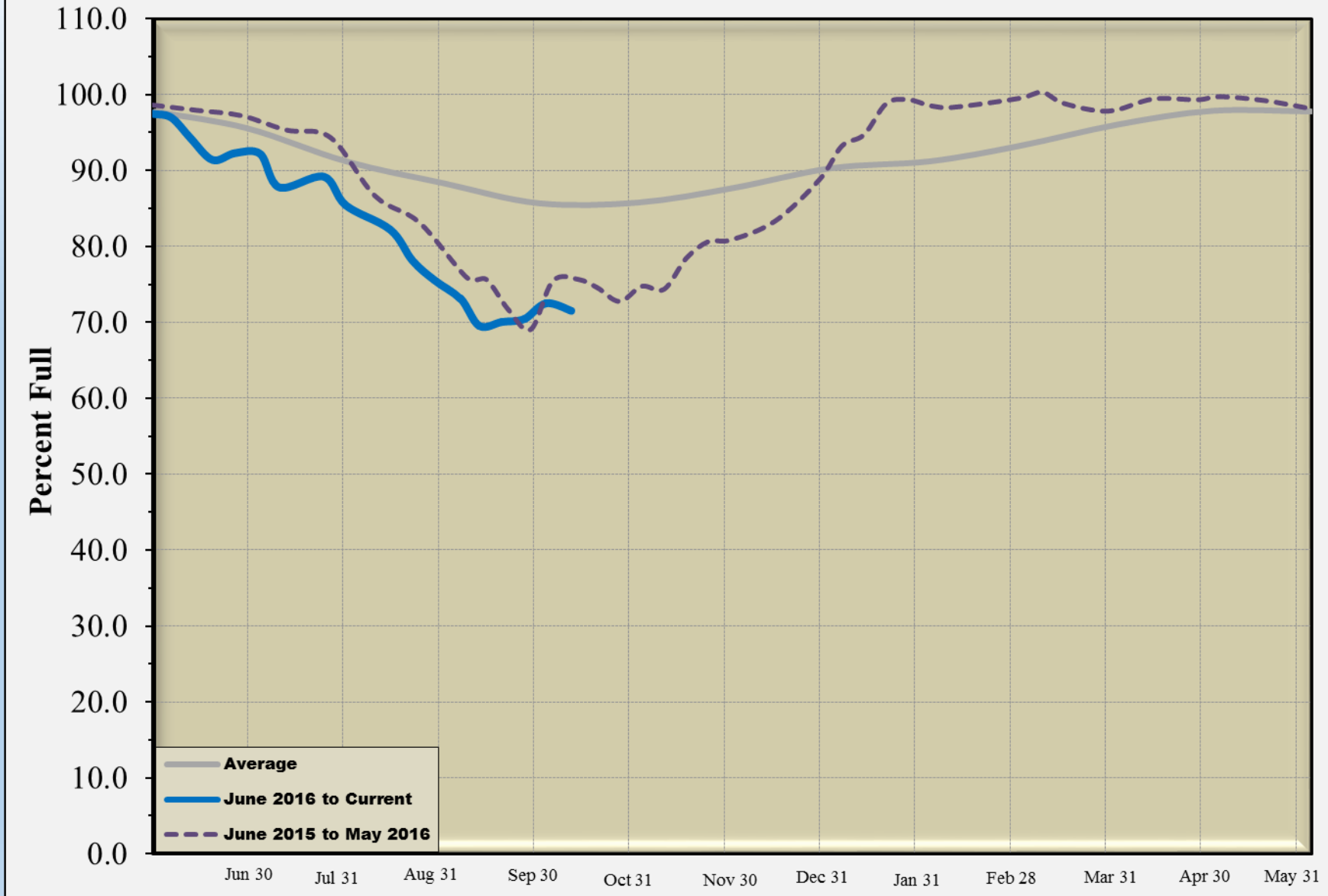
Suez-NJ Reservoir Storage

October 17, 2016

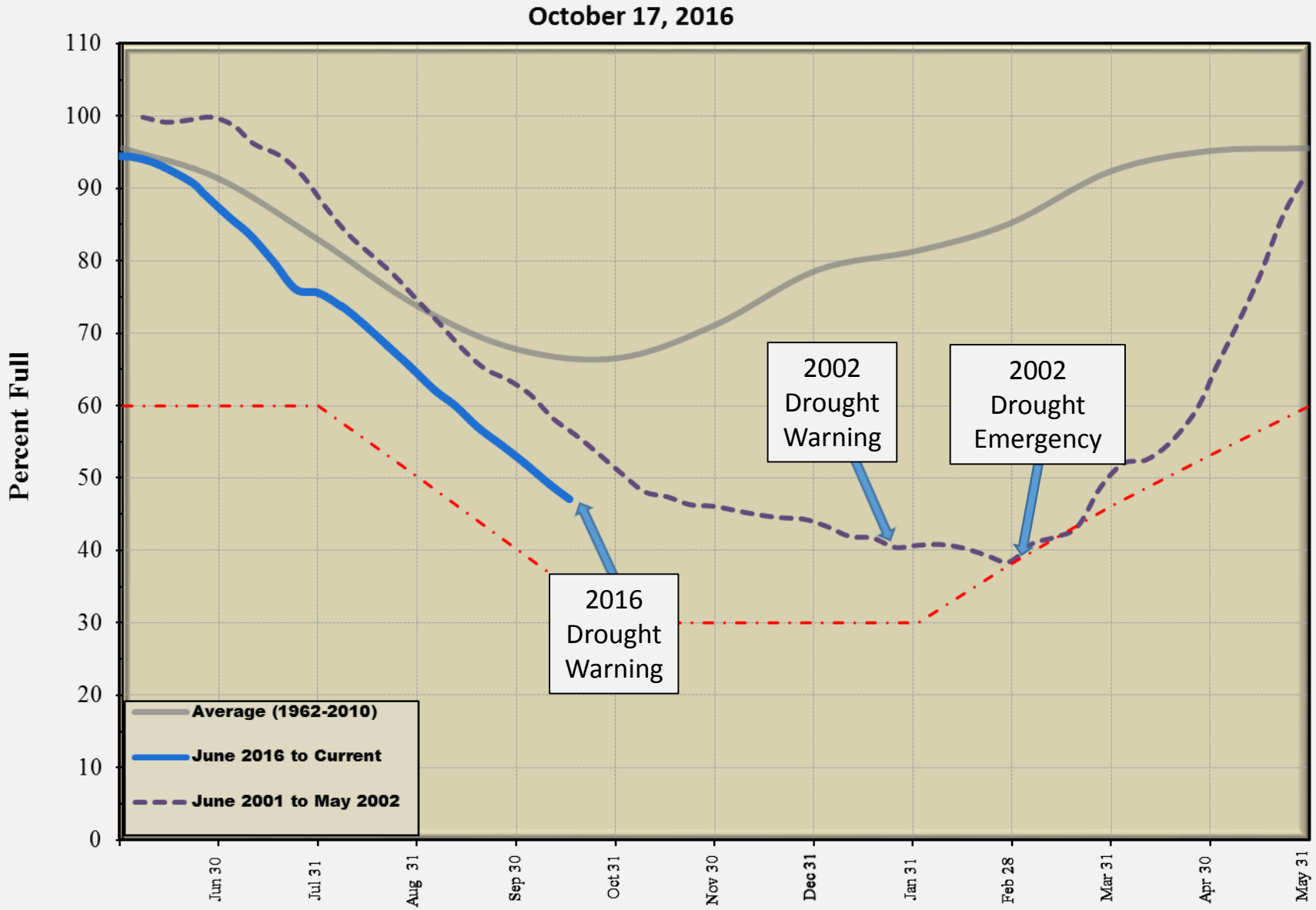



Combined Round Valley-Spruce Run Reservoirs as of 10/17/2016
Percent Full
110
100
90
80
70
60
50
40
30
20
10
0
Jun 30
Jul 31
Aug 31
Sep 30
Oct 31
Nov 30
Dec 31
Jan 31
Feb 28
Mar 31
Apr 30
May 31
June 2016 to May 2017
June 2015 to May 2016
Average (1970-2010)

Combined Coastal North Reservoirs
10/17/2016



North Jersey District Reservoirs



Normal

Non-Emergency

Emergency

Mandatory Demand-side Actions

Watch

Voluntary Demand-side Measures

Warning

Mandatory Supply-side Measures

Phases I-IV

So, what is a Drought Warning anyway?

- Drought Warning is a non-emergency phase of managing available water supplies as drought conditions persist
- The aim of Drought Warning is to reduce the likelihood of a more serious water shortage, which in turn could lead to a Water Emergency
- Under Drought Warning, the DEP may direct any of the following types of actions:
  - Develop alternative sources of water
  - Complete interconnections between systems
  - Transfer water between systems or regions of the State
  - Other modifications or measures to ensure an adequate water supply
  - Mandatory water use restrictions are not imposed under a Warning; however, the public is urged to use water sparingly in the affected areas
- A Water Emergency includes:
  - Mandatory water use restrictions – residential, commercial/industrial
  - Water use rationing
  - Selective Curtailment - potentially drastic measures (to preserve public health and safety)

Drought Warning Measures

- Primary goal is to preserve storage and balance supplies within the affected region(s)
- Objective is to achieve parity among supply sources so that they are drawn down uniformly until normal rainfall resumes
- Specific types of measures –
  - Transfers of water between individual systems
  - Water transfers between regions (e.g. Central to Northeast)
  - Water service substitutions
  - Temporary modifications of reservoir releases and regulated stream passing flows
    - Coordinated with other DEP programs (DWQ and Fish & Wildlife) to ensure no adverse impacts occur
- DEP is only able to limit water demands under a Water Emergency declared by the governor


www.njdrought.org